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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,507	01/17/2002	Minoru Maeda	10830-087001	1777

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EXAMINER	
LYONS, MICHAEL A	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/051,507	MAEDA, MINORU	
	Examiner	Art Unit	
	Michael A Lyons	2877	

-- The MAILING DATE of this communication app ars on the cover sheet with th correspond nc addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luke et al (6,137,573) in view of Sica, Jr. et al (4,280,764).

Regarding claim 1, Luke (Fig. 1) discloses a Michelson interferometer with a collimating lens 44, a first beam splitter 46, a first reflector 56, a second reflector 64, the beam splitter and reflector pair making up the interference pattern generating means. Luke also discloses a second beam splitter 66, a first photodetector 78, a second photodetector 82, and a computer 84 for a signal processor. The device, however, fails to disclose a first and second slit provided in front of the photodetectors, and no inclination of either the first or second reflector.

The addition of slits in front of a photodetector would only serve to restrict the amount of light striking the photodetector, and the addition of such slits to an optical device becomes a matter of design. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a first and second slit in front of the first and second photodetector of Luke to control the amount of light striking the photodetectors.

Furthermore, Sica, Jr. (Fig. 1) discloses a similar interferometer where one of the reflectors, mirror 27, is disposed at an angle, generating tilt in the wavefront reflected off it and creating straight, rather than circular, interference fringes since the optical axis of the wavefront

would be inclined to the axis of the wavefront reflecting from the perpendicular reference mirror 25. Since mirror 56 of Luke is already translated, adding an additional degree of freedom to the movement in the form of tilt to generate an inclined wavefront would not be out of the realm of one skilled in the art, since generating a tilt is motion in its own right. Therefore, it would have been further obvious to one of ordinary skill in the art at the time the invention was made to tilt one of the reflectors of Luke as per Sica, Jr. to facilitate the inclination of one wavefront with respect to another.

As for claim 2, see above.

As for claim 3, Official Notice is taken as to the common use of the insertion of a wedge in an optical path to change the characteristics of the light and thereby create interference.

As for claims 4 and 5, the varying width and slit positioning is a matter of design choice, as all it would do is vary the amount of light reaching the photodetector.

As for claim 6, the specific size and position variation of the photodetectors is a matter of design choice, as changing the size and position would only vary the amount of light striking them.

Claims 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al (5,684,545).

Regarding claim 7, Dou (Fig. 1) discloses a Mach-Zehnder interferometer with a first beam splitter 14, a first reflector 20, a second reflector 22, and a second beam splitter 26, the second beam splitter and reflector pair being the interference pattern generating means. Dou also discloses a third beam splitter 46, a first CCD 34, a second CCD 48, and monitors 38 and 52 to

process the signals generated by the CCDs. The device, however, fails to disclose a collimating lens or a first and second slit.

The addition of a collimating lens and a first and second slit to a device is a matter of design, as the collimating lens merely collimates light without changing its properties while the slits control the amount of light passing through that particular region of the device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the collimating lens and slit pair to the device of Dou to collimate and control the amount of light passage, respectively.

As for claims 8-10, Dou discloses the use of a liquid crystal device (42 in Fig. 1), that is "preferably able to rotate through all angles"; "accordingly, one can get a tilt and spin effect" (Col. 2, lines 52-54). As such, the tilt effect will lead to the interfering wavefronts of the device to have optical axes inclined to one another, generating the according straight interference fringes rather than circular (see Fig. 4). As the LCD generates the desired effects of tilting a mirror or beamsplitter, or inserting a wedge substrate into a path of the interferometer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an LCD in the place of the above tilt or insertion, as the LCD's effects are functionally equivalent to the tilt of a mirror or beamsplitter or the insertion of a wedge.

As for claims 11 and 12, the varying width and slit positioning is a matter of design choice, as all it would do is vary the amount of light reaching the photodetector.

As for claim 13, the specific size and position variation of the photodetectors is a matter of design choice, as changing the size and position would only vary the amount of light striking them.

Claims 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al (5,684,545).

Regarding claim 14, Dou (Fig. 1) discloses a Mach-Zehnder interferometer with a first beam splitter 14, a first reflector 20, a second reflector 22, and a second beam splitter 26, the second beam splitter and reflector pair being the interference pattern generating means. Dou also discloses a first CCD 34, a second CCD 48, and monitors 38 and 52 to process the signals generated by the CCDs. The device, however, fails to disclose a collimating lens or a first and second slit.

The addition of a collimating lens and a first and second slit to a device is a matter of design, as the collimating lens merely collimates light without changing its properties while the slits control the amount of light passing through that particular region of the device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the collimating lens and slit pair to the device of Dou to collimate and control the amount of light passage, respectively.

As for claims 15-17, Dou discloses the use of a liquid crystal device (42 in Fig. 1), that is "preferably able to rotate through all angles"; "accordingly, one can get a tilt and spin effect" (Col. 2, lines 52-54). As such, the tilt effect will lead to the interfering wavefronts of the device to have optical axes inclined to one another, generating the according straight interference fringes rather than circular (see Fig. 4). As the LCD generates the desired effects of tilting a mirror or beamsplitter, or inserting a wedge substrate into a path of the interferometer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an

LCD in the place of the above tilt or insertion, as the LCD's effects are functionally equivalent to the tilt of a mirror or beamsplitter or the insertion of a wedge.

As for claims 18 and 19, the varying width and slit positioning is a matter of design choice, as all it would do is vary the amount of light reaching the photodetector.

As for claim 20, the specific size and position variation of the photodetectors is a matter of design choice, as changing the size and position would only vary the amount of light striking them.

Claims 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al (5,684,545).

Regarding claim 21, Dou (Fig. 1) discloses a Mach-Zehnder interferometer with a first beam splitter 14, a first reflector 20, a second reflector 22, and a second beam splitter 26, the second beam splitter and reflector pair being the interference pattern generating means. Dou also discloses a third beam splitter 46, a first CCD 34, a second CCD 48, and monitors 38 and 52 to process the signals generated by the CCDs. The device, however, fails to disclose a collimating lens or a first and second slit.

The addition of a collimating lens and a first and second slit to a device is a matter of design, as the collimating lens merely collimates light without changing its properties while the slits control the amount of light passing through that particular region of the device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the collimating lens and slit pair to the device of Dou to collimate and control the amount of light passage, respectively.

In addition, while the interferometer of Dou is not arranged such that the light passes from the first beam splitter to the first reflector directly to the second reflector and then to the second beam splitter, it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the parts to suit the claimed order, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske,* 86 USPQ 70.

As for claims 22-24, Dou discloses the use of a liquid crystal device (42 in Fig. 1), that is "preferably able to rotate through all angles"; "accordingly, one can get a tilt and spin effect" (Col. 2, lines 52-54). As such, the tilt effect will lead to the interfering wavefronts of the device to have optical axes inclined to one another, generating the according straight interference fringes rather than circular (see Fig. 4). As the LCD generates the desired effects of tilting a mirror or beamsplitter, or inserting a wedge substrate into a path of the interferometer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an LCD in the place of the above tilt or insertion, as the LCD's effects are functionally equivalent to the tilt of a mirror or beamsplitter or the insertion of a wedge.

As for claims 25 and 26, the varying width and slit positioning is a matter of design choice, as all it would do is vary the amount of light reaching the photodetector.

As for claim 27, the specific size and position variation of the photodetectors is a matter of design choice, as changing the size and position would only vary the amount of light striking them.

Claims 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al (5,684,545).

Regarding claim 28, Dou (Fig. 1) discloses a Mach-Zehnder interferometer with a first beam splitter 14, a first reflector 20, a second reflector 22, and a second beam splitter 26, the second beam splitter and reflector pair being the interference pattern generating means. Dou also discloses a first CCD 34, a second CCD 48, and monitors 38 and 52 to process the signals generated by the CCDs. The device, however, fails to disclose a collimating lens or a first and second slit.

The addition of a collimating lens and a first and second slit to a device is a matter of design, as the collimating lens merely collimates light without changing its properties while the slits control the amount of light passing through that particular region of the device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the collimating lens and slit pair to the device of Dou to collimate and control the amount of light passage, respectively.

In addition, while the interferometer of Dou is not arranged such that the light passes from the first beam splitter to the first reflector directly to the second reflector and then to the second beam splitter, it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the parts to suit the claimed order, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske,* 86 USPQ 70.

As for claims 29-31, Dou discloses the use of a liquid crystal device (42 in Fig. 1), that is "preferably able to rotate through all angles"; "accordingly, one can get a tilt and spin effect" (Col. 2, lines 52-54). As such, the tilt effect will lead to the interfering wavefronts of the device to have optical axes inclined to one another, generating the according straight interference

fringes rather than circular (see Fig. 4). As the LCD generates the desired effects of tilting a mirror or beamsplitter, or inserting a wedge substrate into a path of the interferometer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an LCD in the place of the above tilt or insertion, as the LCD's effects are functionally equivalent to the tilt of a mirror or beamsplitter or the insertion of a wedge.

As for claims 32 and 33, the varying width and slit positioning is a matter of design choice, as all it would do is vary the amount of light reaching the photodetector.

As for claim 34, the specific size and position variation of the photodetectors is a matter of design choice, as changing the size and position would only vary the amount of light striking them.

Response to Arguments

Applicant's arguments filed September 2, 2003 have been fully considered but they are not persuasive. Firstly, the applicant's arguments with respect to claims 1-34 have been considered but are moot in view of the new ground(s) of rejection as depicted above. In particular, the rejections of claims 1 and 2, in addition to claims 8-10 and the other dependent claims identical to them, cover the amended portions of the claims and the arguments with regards to the tilted mirror generating inclined wavefronts, in addition to the well known statements of the previous Office Action.

With regards to the use of multiple photodetectors in claims 7, 14, 21, and 28, Dou does disclose multiple photodetectors as discussed above. Only a single photodetector, 34, is directly sending signals to computer 38, and not both. However, having the second photodetector send signals to the computer as well, instead of the separate monitor 52, is duplicating the parts of the

invention. Hooking both detectors to the computer, instead of one to the computer and one to the monitor, would have been obvious to one of ordinary skill, as having both photodetectors sending signals to the computer is not critical to the working of the device, as no properties of the light is changed in the instant application from splitting to receipt at each individual photodetector. Additionally, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.*

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 703-305-1933. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on 703-308-4877. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0935.

MAL
November 4, 2003

Samuel A. Turner
Primary Examiner